

CLAIMS

1. An apparatus for application of a coating material to the exterior surface of a pipe comprising:

a stator disposed around the exterior surface of the pipe;

5 a substantially annular rotor rotationally disposed within the stator and having a common central axis with the pipe, the rotor having at least one internal gallery extending substantially around the radius of the pipe;

at least one coating head having an internal passage for the coating material and an opening in close contact with the exterior surface of the

10 pipe, the internal passage connected to the at least one internal gallery;

drive means for rotating the rotor and the at least one coating head around the exterior of the pipe;

means for supplying the coating material from an external source to the at least one internal gallery; and

15 means for applying positive air pressure to the at least one internal gallery, whereby the coating material is forced by air pressure through the at least one internal gallery and ejected onto the exterior surface of the pipe through the at least one coating head.

20 2. The apparatus of Claim 1 wherein the means for supplying the coating material and the means for applying positive air pressure further comprises at least one vacuum displacement pump attached to the stator, each of the at least one vacuum displacement pumps having a first port for connection to an external source of coating material and a second port for
25 connection to an external source of compressed air.

3. The apparatus of Claim 2 wherein the at least one vacuum displacement pump further comprises an outlet opening into the at least one internal gallery.

4. The apparatus of Claim 3 wherein sealing means are provided between the at least one internal gallery and the outlet to prevent release of the coating material from the at least one internal gallery.

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5. The apparatus of any preceding claim further comprising at least one air port in the stator, the air port connected to a pressurized air source whereby a positive air pressure is maintained on the sealing means.

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6. The apparatus of any preceding claim wherein the at least one coating head has a diffusing means within the internal passage of the at least one coating head.

7. The apparatus of any preceding claim further comprising means for supplying a grit from an external source to the at least one internal gallery and means for applying positive air pressure to the at least one internal gallery, whereby the grit is forced by air pressure through the at least one internal gallery and ejected onto the exterior surface of the pipe through the at least one coating head.

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8. The apparatus of any preceding claim further comprising means for supplying a gas from an external source to the at least one internal gallery and means for applying positive air pressure to the at least one internal gallery, whereby the heated gas is forced by air pressure through the at least one internal gallery and ejected onto the exterior surface of the pipe through the at least one coating head.

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9. The apparatus of any preceding claim further comprising means for supplying a quench fluid from an external source to the at least one internal

gallery and means for applying positive air pressure to the at least one internal gallery, whereby the quench fluid is forced by air pressure through the at least one internal gallery and ejected onto the exterior surface of the pipe through the at least one coating head.

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10. The apparatus of any preceding claim wherein the stator and the rotor include means for opening and closing around the pipe.

11. The apparatus of any preceding claim further comprising at least one magnetic induction heater to heat the pipe prior to placement of the coating material onto the exterior surface of the pipe.

12. A method of applying a coating material to the exterior surface of a pipe comprising the following steps:

15 supplying at a positive air pressure the coating material to a stationary element surrounding the pipe;

transferring the coating material from the stationary element to a gallery within a rotating element disposed substantially within the stationary element, the gallery substantially surrounding the pipe; and

20 ejecting the coating material onto the exterior surface of the pipe from a one or more coating heads having an internal passage connected to the gallery.

13. The method of Claim 12 further comprising the following steps:

25 supplying at a positive air pressure a grit to the stationary element; transferring the grit from the stationary element to the gallery; and ejecting the grit onto the exterior surface of the pipe from one or more coating heads.

14. The method of Claims 12 or 13 further comprising the following steps:

- supplying at a positive air pressure a gas to the stationary element;
- transferring the gas from the stationary element to the gallery; and
- 5 ejecting the gas onto the exterior surface of the pipe from one or more coating heads.

15. The method of any one of Claims 12 to 14 further comprising the following steps:

- 10 supplying at a positive air pressure a quench liquid to the stationary element;
- transferring the quench liquid from the stationary element to the gallery;
- and
- ejecting the quench liquid onto the exterior surface of the pipe from one
- 15 or more coating heads.

16. An apparatus for application of a coating material to the exterior surface of a pipe comprising:

- a substantially annular-shaped body disposed around the exterior of
- 20 the pipe;
- at least one entry port peripherally disposed around the body, the entry port connected to a first end of an intake chamber disposed within the body;
- a compression chamber disposed within the annular-shaped body
- 25 and extending substantially around the radius of the pipe, a first end of the chamber connected to a second end of the intake chamber;
- at least one diffusing chamber disposed within the annular-shaped body and extending substantially around the radius of the pipe, a first end of each the at least one diffusing chambers connected to a second end of the

compression chamber;

a gallery disposed within the inner circumferential side of the annular-shaped body, a second end of each the at least one diffusing chambers opening into the galley;

- 5 an interchangeable sleeve disposed against the inner circumferential side of the annular-shaped body, the interchangeable sleeve having one or more openings to the gallery;

means for supplying the coating material from an external source to each of the at least one entry ports; and

- 10 means for applying positive air pressure to each of the at least one entry ports, whereby the coating material is forced under air pressure successively through the intake, compression and diffusing chambers, into the gallery and ejected through the one or more openings in the interchangeable sleeve onto the exterior surface of the pipe around the
15 entire circumference of the pipe.

17. The apparatus of Claim 16 wherein the means for supplying the coating material and the means for applying positive air pressure further comprises a mixing chamber attached to the entry port, the mixing chamber
20 having a fitting connected to the external source of the coating material and a port to an external source of compressed air.

18. The apparatus of Claims 16 or 17 wherein the annular-shaped body includes means for opening and closing around the pipe.
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19. The apparatus of any one of Claims 16 to 18 further comprising means for supplying a grit from an external source to the at least one entry ports and means for applying positive air pressure to the at least one entry ports, whereby the grit is forced under air pressure successively through the

intake, compression and diffusing chambers, into the gallery and ejected through the one or more openings in the interchangeable sleeve onto the exterior surface of the pipe around the entire circumference of the pipe.

- 5 20. The apparatus of any one of Claims **16** to **19** further comprising means for supplying a gas from an external source to the at least one entry ports and means for applying positive air pressure to the at least one entry ports, whereby the gas is forced under air pressure successively through the intake, compression and diffusing chambers, into the gallery and ejected
10 through the one or more openings in the interchangeable sleeve onto the exterior surface of the pipe around the entire circumference of the pipe.

21. The apparatus of any one of Claims **16** to **20** further comprising means for supplying a quench liquid from an external source to the at least
15 one entry ports and means for applying positive air pressure to the at least one entry ports, whereby the quench liquid is forced under air pressure successively through the intake, compression and diffusing chambers, into the gallery and ejected through the one or more openings in the interchangeable sleeve onto the exterior surface of the pipe around the
20 entire circumference of the pipe.

22. The apparatus of any one of Claims **16** to **21** further comprising at least one magnetic induction heater to heat the pipe prior to placement of the coating material on to the exterior surface of the pipe.
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23. A method of applying a coating material to the exterior surface of a pipe comprising the following steps:

supplying at a positive air pressure the coating material to an at least one intake chamber within a substantially annular-shaped body

surrounding the pipe;

compressing the coating material received from the at least one intake chamber in a compression chamber substantially surrounding the exterior of the pipe within the body;

5 diffusing the coating material exiting the compression chamber in an at least one diffusing chamber substantially surrounding the exterior of the pipe within the body; and

ejecting the coating material from the at least one diffusing chamber onto the exterior surface of the pipe.

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24. The method of Claim **23** further comprising the following steps:

supplying at a positive air pressure a grit to the at least one intake chamber;

15 compressing the grit received from the at least one intake chamber in the compression chamber;

diffusing the grit exiting the compression chamber in the at least one diffusing chamber;

injecting the grit exiting the compression chamber into the gallery; and

20 ejecting the grit from the at least one diffusing chamber onto the exterior surface of the pipe.

25. The method of Claims **23** or **24** further comprising the following steps:

25 supplying at a positive air pressure a gas to the at least one intake chamber;

compressing the gas received from the at least one intake chamber in the compression chamber;

diffusing the gas exiting the compression chamber in the at least one diffusing chamber;

injecting the gas exiting the compression chamber into the gallery; and
ejecting the gas from the compression chamber onto the exterior surface
of the pipe.

- 5 26. The method of any one of Claims **23** to **25** further comprising the
following steps:

supplying at a positive air pressure a quench liquid to the at least one
intake chamber;

- 10 compressing the quench liquid received from the at least one intake
chamber in the compression chamber;

diffusing the quench liquid exiting the compression chamber in the at
least one diffusing chamber;

injecting the quench liquid exiting the compression chamber into the
gallery; and

- 15 ejecting the quench liquid from the compression chamber onto the
exterior surface of the pipe.